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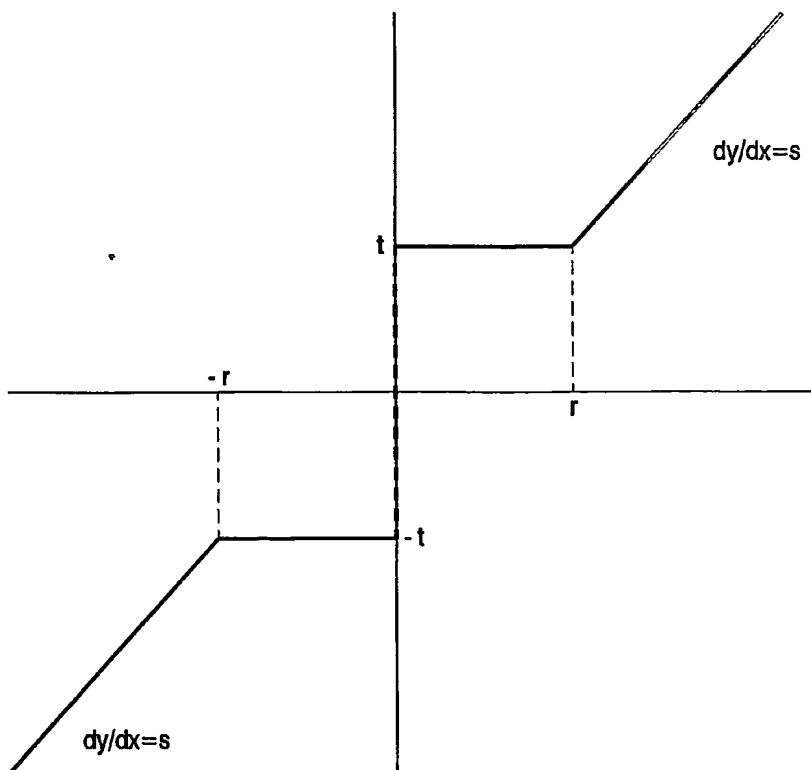
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(54) Title: SIGMA-DELTA MODULATOR



(57) Abstract: A sigma-delta modulator (SDM) including n ($n \geq 1$) integrators in series, where a first of the n integrators receiving an input signal, at least one Q device, which acts as a quantizer when an absolute value of a signal input thereto is smaller and as a gain element (either with or without offset) when the absolute value of the signal input thereto is larger, and a device for quantizing an output of the unit. The SDM may be a feed back or feed forward SDM. The SDM may include a single or multiple Q devices. The single Q device may be positioned so that the signal input to the one Q device is an output of the last integrator and the output of the one device Q_i is input to the device for quantizing and/or to the n integrators. For multiple Q devices, each of the Q devices may have different parameters set to improve stability, improve SNR, and/or reduce introduction of artifacts. The SDM may be part of an analog to digital converter and/or a digital to digital converter. The SDM may process digital or analog signals, for example, a 1-bit signal.

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